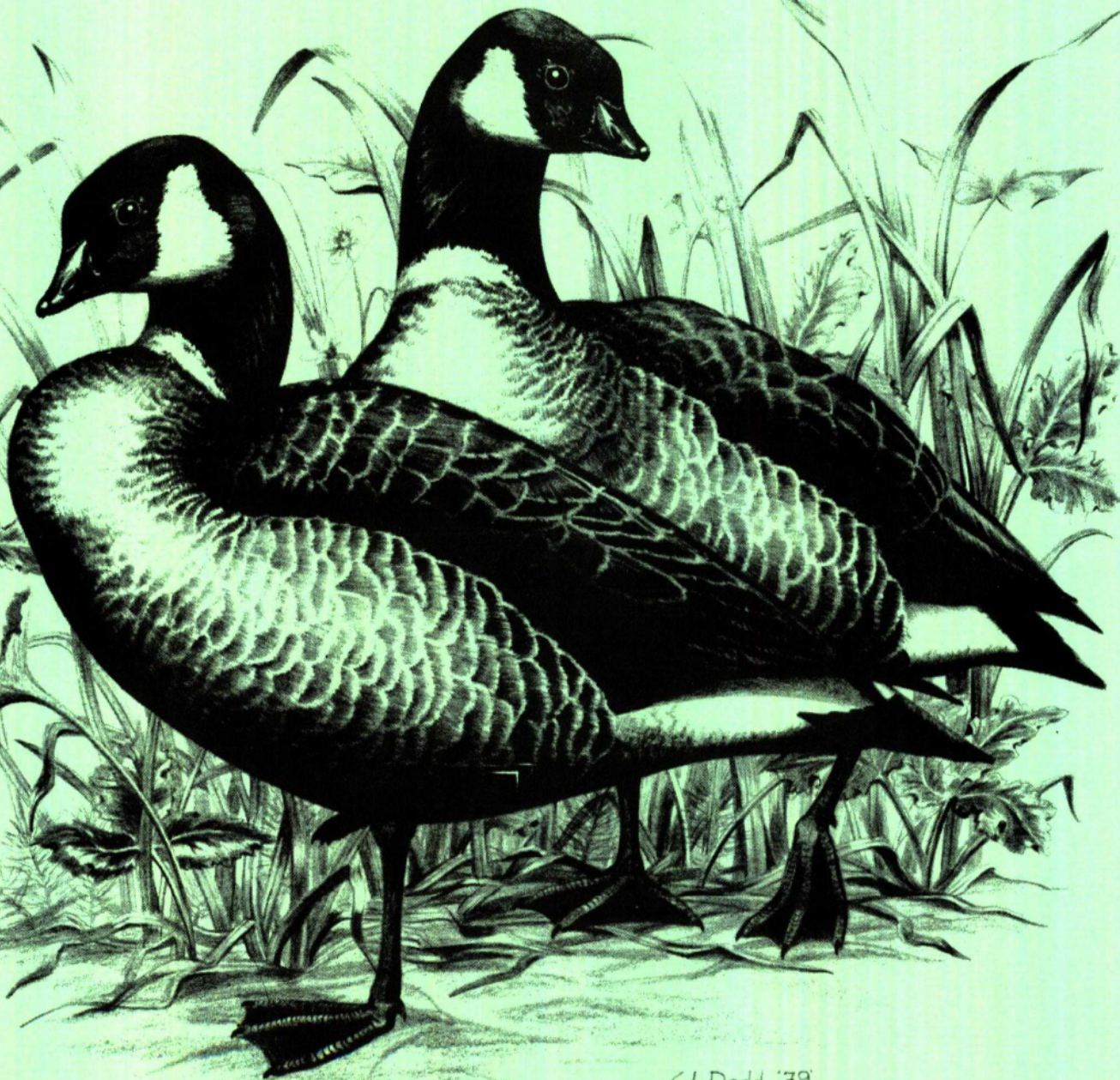


Aleutian Canada Goose Recovery Plan



C.L.Dodd '79

ALEUTIAN CANADA GOOSE
Branta canadensis leucopareia

RECOVERY PLAN

Second Revision

(Original Approved: August 7, 1979)
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This is the completed Aleutian Canada Goose Recovery Plan. It has been approved by the U. S. Fish and Wildlife Service. It does not necessarily represent official positions or approval of cooperating agencies and does not necessarily represent the views of all who played a role in preparing this plan. It has been prepared by the U.S. Fish and Wildlife Service to delineate reasonable actions which are believed to be required to recover and/or protect the species. This plan is subject to modification as dictated by new findings, changes in species status, and completion of tasks described in the plan. Goals and objectives will be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints.

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Cover drawing by C.L. DODD

EXECUTIVE SUMMARY
ALEUTIAN CANADA GOOSE RECOVERY PLAN

Current Status: Presently numbering approximately 7,000 birds, this species was reclassified from endangered to threatened status in 1991. Three separate remnant segments of the breeding population occur on islands of the Aleutian Chain and Alaska Peninsula. Present wintering grounds are in coastal Oregon and the Central Valley of California.

Habitat Requirements and Limiting Factors: The Aleutian goose winters on agricultural lands which are mostly in private ownership. Recovery on the wintering grounds is threatened by changing agricultural practices, continued urbanization, and potential disease outbreak. Although the breeding islands are protected, numbers at two of the three breeding segments remain at low levels. Recovery on the breeding grounds is threatened by introduced foxes and rodents, and resident bald eagles.

Recovery Objective: Delisting

Recovery Criteria: An overall population greater than 7,500 geese, with at least 50 pairs nesting in each of the three remnant breeding areas: western Aleutians (excluding Buldir), central Aleutians, and Semidi Islands. 25,000-35,000 acres of migration and wintering habitat are secured and managed for Aleutian geese. A specific acreage target will be set following completion of winter habitat research; however, failure to achieve a specific acreage target will not necessarily preclude delisting if otherwise warranted.

Actions Needed:

1. Protect population and secure winter habitat.
2. Conduct needed biological research.
3. Reintroduce geese and manage breeding habitat.
4. Manage migration and wintering habitat.
5. Verify/determine recovery objectives.

Costs (\$000):

<u>Year</u>	<u>Need 1*</u>	<u>Need 2</u>	<u>Need 3</u>	<u>Need 4</u>	<u>Need 5</u>	<u>Total</u>
1992	28	121	163	58	50	420
1993	28	121	156	46	25	376
1994	28	157	164	53	25	427
1995	28	31	263	46	25	393
1996	28	20	264	81	37	430
1997	28	0	274	68	22	392
1998	28	0	264	78	22	392
1999	28	0	264	83	22	397
2000	28	0	56	83	22	189
2001	28	0	46	83	37	194
2002	28	0	46	83	22	179
2003	28	0	56	83	22	189
2004	28	0	46	83	22	179
2005	28	0	46	83	22	179
<u>Total</u>	392	450	2108	1011	375	4336

* Costs of securing habitat not included because the manner of habitat protection is not known.

Date of Recovery: Delisting should be initiated by about 2005, or whenever recovery criteria are met.

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PART I

INTRODUCTION

The Aleutian Canada goose (Branta canadensis leucopareia) is a small island-nesting subspecies of the Canada goose that historically is thought to have bred from near Kodiak Island, Alaska, to the Kuril Islands in Asia (Fig. 1), and wintered in Japan and reportedly from British Columbia to northern Mexico (Delacour 1954). By the early 1930's the goose had been decimated throughout most of its breeding range by introduced foxes. It was designated an endangered species in 1967. A formal recovery program began in the mid-1970's when the population numbered about 800 birds, and by 1991 the Aleutian Canada goose population had recovered sufficiently (7,000 birds) to be reclassified to threatened.

Actions listed in this revised recovery plan are designed to help the recovery process continue until the goose is no longer in need of the special protection afforded by the Endangered Species Act.

Description

Although the taxonomy of Canada geese is under review (e.g., Hanson in prep) we describe morphological differences in Aleutian geese and closely related taxa recognized by Delacour (1954) and Bellrose (1976). Aleutian Canada geese resemble other small Canada goose subspecies such as the cackling Canada goose (B.c. minima), Taverner's Canada goose (B.c. taverneri), and lesser

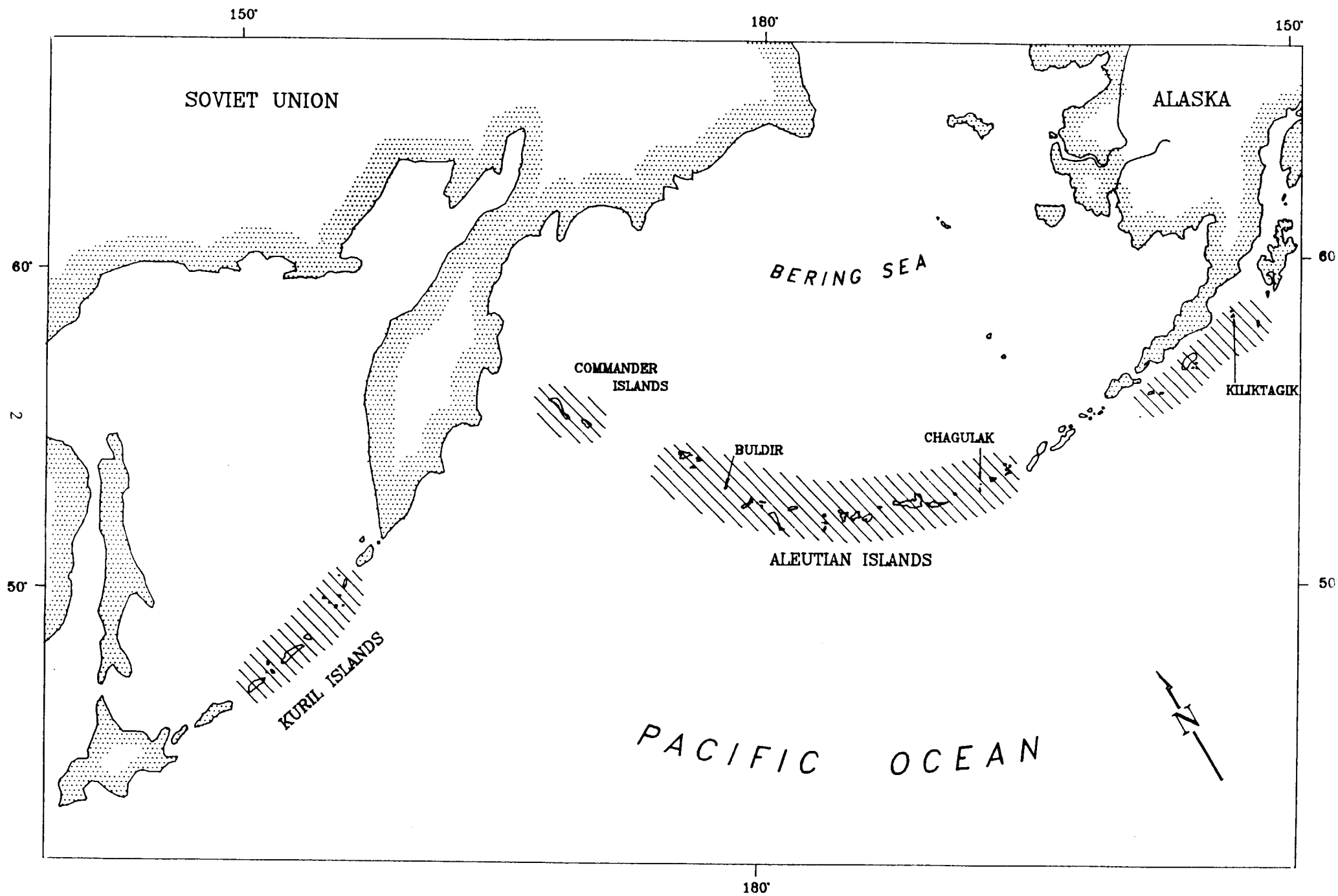


Figure 1. Map showing the historical breeding distribution of Aleutian Canada Geese.

Canada goose (B.c. parvipes). The Aleutian goose is intermediate in size between cackling geese, the smallest race, and Taverner's geese, but there is overlap in measurements (Johnson et al. 1979).

Although there is currently no known single character that absolutely distinguishes Aleutian Canada geese from the other subspecies, a combination of morphological characters can separate most of the birds. Discriminate function analysis of certain morphological features offers a useful method in this regard (Johnson et al. 1979). Plumage criteria may also be used to help separate subspecies. The breast feathers of cacklers are darker than those of Aleutian geese, and have a purplish or tannish cast. Taverner's, lessers, and Aleutians are similar in breast color, usually ranging between brownish gray and grayish brown (Johnson et al. 1979).

Nearly all Aleutians after their first winter have a ring of white feathers at the base of their black necks. This ring averages 20 mm in width in adults and 14 mm in first-spring birds. The other subspecies also contain some individuals with white neck rings, but they are generally incomplete or, if complete, they are generally narrower than neck rings of Aleutians. For example, P.G. Mickelson (unpubl. data) estimated that less than one-third of the thousands of adult cacklers he observed on the Yukon Delta, Alaska, had white neck rings, and most were less than 10 mm in width. Johnson et al. (1979) found that 23 percent of the Taverner's measured at Cold Bay, Alaska, had complete neck rings that averaged 3-5 mm in width.

Other characters that are more pronounced in Aleutians than in other small subspecies are an abrupt forehead, separation of the cheek patches by black feathering ventrally, and a narrow border of dark feathering along the bottom of the white neck ring. Aleutians also have more tapered bills (when viewed from above) than other subspecies.

Historical Range and Abundance

Delineating the historic range of the Aleutian Canada goose is difficult due to the sparsity of written records for the isolated region where it occurred. Further obscuring the historic record was confusion about the taxonomic status of various populations of Canada geese. Nevertheless, anecdotal reports provide evidence that Aleutian Canada geese bred from the Geese Islands near Kodiak (E.P. Bailey pers. comm.) westerly on islands south of the Alaska Peninsula, throughout the Aleutian (Dall 1874, Turner 1886, Clark 1910, Jochelson 1933, Murie 1959) and Commander islands (Stejneger 1885) and at least as far southwest as the central Kuril Islands (Snow 1897) (Fig. 1). Populations are said to have wintered from British Columbia to northern Mexico in North America and in Japan on the Asian side of the Pacific Ocean (Delacour 1954).

Apparently, remnant breeders survived the fox-farming era on only three fox-free islands, Kiliktagik in the Semidi Group (Hatch and Hatch 1983), Chagulak in the central Aleutians (Bailey and Trapp 1984), and Buldir in the western Aleutians (Jones 1963).

Almost nothing is known about the former abundance of this goose except statements by Clark (1910) that it bred in the thousands on Agattu Island. This same description of abundance was used by Turner (1886) for Agattu, and he added that the goose was an abundant nester on Semichi (present-day Alaid, Nizki, and Shemya Islands) and occurred in large numbers in fall at Attu Island.

Reasons for Decline

The decline of Aleutian Canada geese coincided with the onset of fur-farming on Alaskan and northeastern Asian islands. Arctic (Alopex lagopus) and red (Vulpes vulpes) foxes were released on most goose nesting islands, principally between 1915 and 1939 but dating back as early as the 1750's (Gray 1939, Bailey and Kaiser in press). Foxes decimated populations of many species of native birds, but the endemic geese were particularly susceptible to predation before the young birds fledged and when the molting adults became flightless. Their demise was apparently rapid as indicated by the following record for Agattu. In the early 1900's Clark (1910) found geese to be abundant on Agattu, and he suggested that such abundance could be attributed to the absence of foxes. From 1923 to 1930 arctic foxes were released in several different years at Agattu (Gray 1939), and by 1936 over 1,000 pelts had been sold from there, indicating how common the foxes had become. In 1937, less than 15 years after the first foxes were released, Murie (1959) found only a few pairs of geese on Agattu, and they probably were extirpated soon thereafter.

The role of migration and wintering habitat loss in the declines of Aleutian Canada geese is not well understood; nevertheless, changing land use practices, particularly the conversion of land from crops and pastures to housing and other urban development, have likely contributed to the decline historically. Habitat quality has also likely declined due to the concentrated effects of chemical pollution, human disturbance, and disease.

Other factors that may have contributed to the decline of Aleutian Canada geese include subsistence hunting by natives on the nesting area and during migration in Alaska (Turner 1886), and commercial and sport hunting on the wintering grounds (Grinnell et al. 1918). Sport hunting was a limiting factor when populations were low.

Restoration Efforts on Breeding Grounds

Removal of Introduced Foxes.--By the mid-1930's native birds, including geese, were disappearing rapidly from islands where foxes had been released, and O.J. Murie (1936, 1937) was sent to the Aleutians to assess the situation and recommend how the government leasing program should be modified. Following Murie's suggestions, fox-farming leases were revoked on a number of islands. Apparently officials thought foxes remaining on these islands would die without the attention of fox farmers. This apparently was true on many of the Semidi and Alaska Peninsula islands and on some of the smaller islands in the Aleutians. In

contrast, foxes survived on most islands in the Aleutians, at least at low densities, and have precluded reestablishment of native birds, including Aleutian Canada geese.

After World War II, a resident manager was hired for the Aleutian Islands National Wildlife Refuge, and his staff began an active program of fox removal in 1949 using chemical toxicants with follow-up trapping and shooting. Complete eradication of foxes, particularly from relatively large islands, proved to be difficult. Nevertheless, by the mid-1960's the large island of Amchitka was free of foxes. Efforts to restore other areas have continued, although the use of chemical toxicants has been banned or severely restricted since 1972. By 1991, foxes had been eradicated from at least eight other, mostly small, islands (Appendix A).

Reestablishment of Geese on Fox-free Islands.--In order to produce geese for release on islands after foxes were removed, a captive flock of Aleutian Canada geese was developed from goslings captured in 1963 at Buldir, the only known nesting site for the goose at that time (Jones 1963). The small flock was first housed at the Monte Vista National Wildlife Refuge in Colorado, but in 1966 the birds were moved to the Patuxent Wildlife Research Center in Maryland. At Patuxent an intensive breeding program, supplemented with additional breeding stock from Buldir, provided geese for release on fox-free islands in the early to mid-1970's.

In 1976, 30 Aleutian Canada goose eggs were collected at

Buldir and sent to Amchitka where 26 goslings were reared. That fall the goslings were moved to the Northern Prairie Wildlife Research Center in North Dakota to provide a basis for a pedigreed breeding flock. The next year a propagation program also began at Amchitka. The objective for expanding the captive propagation capacity was to provide substantial numbers of geese annually for release. Furthermore, the facility at Amchitka provided a means of allowing geese to adapt to the Aleutian climate and photoperiod.

A number of release techniques were tried at Amchitka, Agattu, and Nizki-Alaid islands from 1971-1982 (Table 1). Results from captive-reared birds were initially disappointing. A small proportion of released birds showed up on the wintering grounds in California, suggesting low survival or at least that they were not migrating in the normal manner. It seemed plausible that a unique situation existed whereby, without the leadership of experienced wild birds, the released geese (or at least part of them) flew southward over the vast Pacific Ocean and failed to find land. With this hypothesis in mind, Forrest Lee (unpubl. rep.) developed a plan whereby older wild males, which had made at least one round-trip migration, were captured and mated with captive-reared females. The object was to produce large family groups, one member of which (the adult male) knew the traditional migration route. Family groups resulting from these special matings were released from 1980-1982, and the survival rates increased somewhat. Nevertheless, there was still lower survival rates than

Table 1. Summary of translocations and releases of
Aleutian Canada geese (all in western Aleutians).

Year	Description	Released	Location
1971	Captive-reared	75	Amchitka
1974	Captive-reared	41	Agattu
	Translocated from Buldir	9	Agattu
1976	Captive-reared	26 ¹	Amchitka
	Translocated from Buldir	3	Amchitka
1978	Captive-reared	117	Agattu
	Translocated from Buldir	22	Agattu
1979	Captive-reared	199	Agattu
	Wild, captive-held	8	Agattu
	Translocated from Buldir	35	Agattu
1980	Golden Birds ²	48	Agattu
	Translocated from Buldir	60	Agattu
	Captive-reared	116	Amchitka
	Wild, captive-held	3	Amchitka
	Captive-reared	20	Buldir
1981	Golden Birds	111	Nizki
	Captive-reared	250	Nizki
	Wild, captive-held	2	Nizki
1982	Golden Birds	210	Agattu
	Captive-reared	64	Agattu
	Wild, captive-held	17	Agattu
	Translocated from Buldir	138	Agattu
1983	Translocated from Buldir	108	Agattu
1984	Translocated from Buldir	86	Agattu
1985	Translocated from Buldir	124	Amchitka
1986	No Translocations		
1987	Translocated from Buldir	136	Amchitka
1988	Translocated from Buldir	116	L. Kiska
		12	Nizki
1989	Translocated from Buldir	25	L. Kiska
		118	Nizki
1990	Translocated from Buldir	25	L. Kiska
		38	Nizki
1991	Translocated from Buldir	55	L. Kiska
		92	Nizki
		36	Agattu

1

All birds not lost to bald eagle predation (17) were recaptured when they failed to migrate.

2

Wild, captive-held males paired with captive-reared females, released with their young, foster young, and associated birds.

with totally wild geese. After 1982 the wild population had increased to a level at which it was considered safe to move wild geese from Buldir to fox-free islands. Captive propagation was phased out, and only wild birds have been translocated since. The captive geese that were not released were made available by loan to zoos and private aviculturists to maintain a reserve gene pool and provide for public education.

Predation by bald eagles (Haliaeetus leucocephalus) has proven to be a serious detriment to reestablishment of geese on islands east of Buldir, the western-most extent of this raptor's range. Efforts to reestablish geese have been concentrated in the Near Island group, west of Buldir, where bald eagles do not occur. Nevertheless, recovery of Aleutian geese to safe levels depends ultimately upon reestablishing birds on islands where eagles occur. Therefore, studies are underway at Little Kiska Island to evaluate the interactions of translocated geese and eagles in the hope that the data will suggest release techniques that may enhance the chances of survival for geese.

The absence of bald eagles in the Near Islands has allowed relatively high survival of released geese. Geese began to breed again on Agattu Island by 1984, and by 1990 the nesting population exceeded 50 pairs (Table 2). A second breeding population at Nizki-Alaid in the Near Island group was started by 1987. Due to continued translocations this population is beginning to expand. Plans are to continue to enhance the population at Nizki-Alaid by additional translocations for 2-3 more years because expanded

Table 2. Nesting pairs of Aleutian Canada geese at different islands other than Buldir (no current estimate for this island) in 1990.

Island	Group	Nests Found	Probable Nests	Estimated Minimum Range
Agattu	Near	56 ^a	3 ^b	56-59
Nizki-Alaid	Near	8	2 ^b	8-10
L. Kiska	Rat	2		
Chagulak	Andreanof	18	3 ^b	18-21
Amukta	Andreanof	1		1
Kiliktagik	Semidi	16	3 ^c	16-19 ^d
	TOTAL:	101	11	101-112

a

includes young broods in areas where no nests were found.

b

prevalence of droppings and consistently defensive pairs in areas of suitable habitat.

c

D. Dragoo pers. comm.

d

In 1991 broods were also found on nearby Anowik Island and this island may have had a few pairs in 1990.

populations in the Near Islands provide the best chance of exceeding the recovery target of 7,500 geese in the near future.

Recently, Siberian scientists have proposed reestablishing Aleutian geese in the Asian portion of their historic range. The project is a cooperative venture with the Japanese (see the following section on restoration on migration and wintering areas). Although the scope of this recovery plan is confined to the United States, continued cooperation with Asian biologists by providing technical assistance and perhaps captive-reared geese

for release is anticipated.

Natural pioneering of geese from existing nesting areas to fox-free islands nearby would greatly enhance the recovery effort in Alaska, and there are two cases of this. A goose nest was found at Amukta Island, near Chagulak, in 1989 and 1990 (Blomstrum and Byrd 1989, Byrd 1990). In 1991, broods of geese were discovered on Anowik Island, near Kiliktagik in the Semidi Islands (R. Lowe pers. comm.). Several carcasses of geese apparently killed by eagles were also discovered at both locations. Eagle predation will probably limit the rate of natural expansion of Aleutian Canada geese. Furthermore, there seems to be a strong tendency for Canada geese of all subspecies to return to natal areas to breed, so rapid natural expansion is not expected.

Restoration on Migration and Wintering Areas

Delineation of Migration and Wintering Areas.--When studies of wild geese started at Buldir in 1974 (Byrd and Woolington 1983), migration routes and wintering areas were unknown. Aleutian geese that had been marked with color leg bands at Buldir Island were subsequently discovered in several parts of California, providing the basis for beginning to delineate primary use areas (Springer et al. 1978, Woolington et al. 1979). Additional banding at Buldir, Chagulak, Kiliktagik, and in California, coupled with annual winter surveys, indicates that there are at least two distinct breeding segments of Aleutian

Canada geese. The Buldir, Agattu, and Nizki-Alaid (i.e., western Aleutian) breeders stage in fall and spring in northern coastal California, concentrate in fall in the Sacramento Valley, and spend the winter in the northern San Joaquin Valley (Fig. 2). In contrast, the Kiliktagik (Semidi Islands) breeders winter in coastal Oregon (Lowe 1990, Fig. 2).

Relatively few Chagulak geese have been banded, but resightings suggest some of these geese use the El Sobrante area near San Francisco Bay, which is also used by some western Aleutian birds, in fall and early winter before joining the bulk of the Aleutian breeders in the San Joaquin Valley during mid-winter. At least one Chagulak breeder has been seen in Oregon's lower Willamette Valley in spring, but the complete spring migration route of Chagulak breeders remains unknown. More banding is needed to determine whether the Chagulak breeders have relatively distinct staging areas and migration routes.

Since the mid-1970's one or more Aleutian Canada geese have been observed during winter in Japan, and during the 1980's captive-reared birds from zoos in Japan have been released with the wild geese in hopes of increasing this population. Aleutian Canada geese were reported to be fairly common winter visitors to Japan until 1922 when less than 200 birds were noted (Austin and Kuroda 1953). As indicated above, in the early 1990's interest has been expressed by the Soviets and Japanese in a cooperative program designed to reestablish Aleutian Canada geese in Asia.

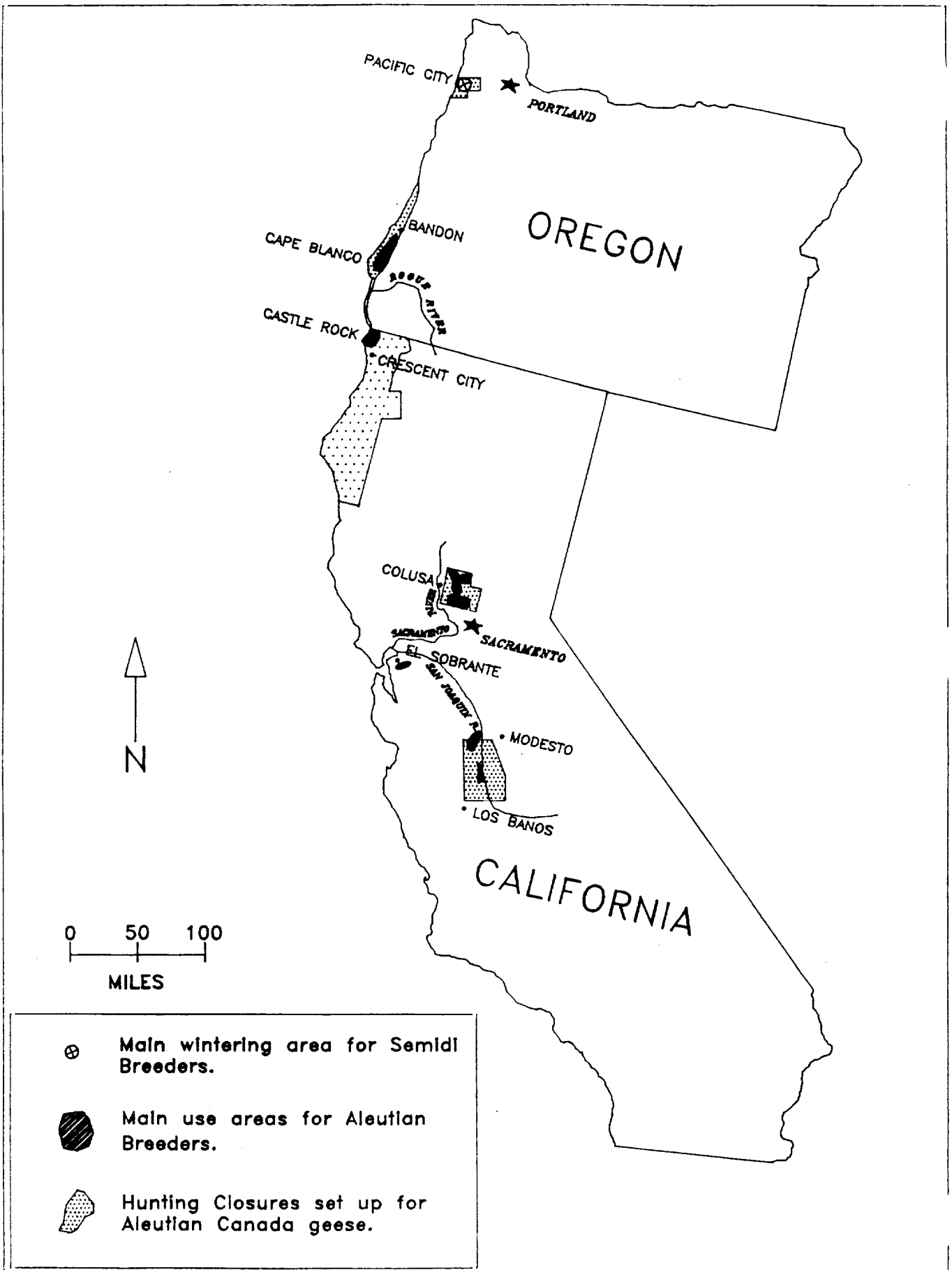


Figure 2. Primary use areas for Aleutian Canada geese in Oregon and California.

Hunting Closures. --Data on the distribution of Aleutian geese were used to delineate areas that needed to be closed to hunting of Canada geese to protect these birds. The area in Alaska west of Unimak Pass was closed to Canada goose hunting beginning in 1973, and three areas in California were closed beginning in 1975 (Fig. 2). A statewide closure of California for cackling and Aleutian Canada geese was implemented in 1984. Additional goose hunting closures to protect migrating and wintering Aleutian Canada geese in Oregon were instituted in 1982 (Fig. 2). Due to declines in cackling Canada geese, the States of Alaska, Washington, Oregon, and California were closed to take of that subspecies in 1984.

Habitat Protection

Most historic nesting islands in Alaska are within the Alaska Maritime National Wildlife Refuge. Restoration of the Aleutian Canada goose is one of the main refuge priorities; therefore, nesting areas are likely to be protected in the long term under existing public ownership.

Migration and wintering areas are not so well protected (Springer and Lowe in press). In Oregon, the major areas used by wintering Aleutian geese (primarily birds breeding in the Semidi Islands) are in private ownership. Nevertheless, the U.S. Fish and Wildlife Service has recently obtained authorization to establish the Nestucca Bay National Wildlife Refuge which includes areas used by the Semidi Island segment of Aleutian geese.

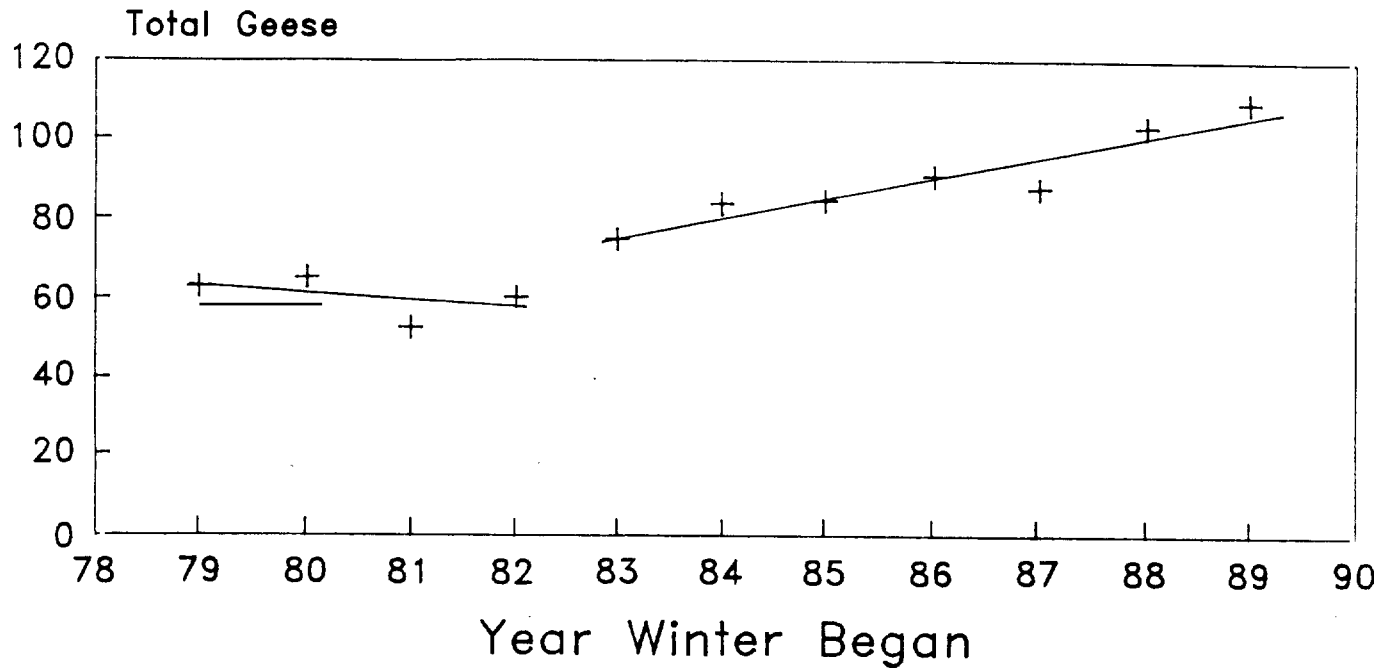
Migrating Aleutian geese from at least the western Aleutian breeding segment use coastal areas in both private and public ownership. One important migration stop, near New River, Oregon, is owned and managed by the Bureau of Land Management who, in cooperation with The Nature Conservancy, will attempt to acquire additional important areas from willing sellers.

Since the beginning of the Aleutian Canada goose recovery effort, an acquisition and easement program has resulted in the protection of some of the important areas of Aleutian Canada goose migration and wintering habitat in California. In 1987 the Fish and Wildlife Service began implementing a program to protect Aleutian goose habitat in the northern San Joaquin Valley as part of the San Joaquin River National Wildlife Refuge. Nevertheless, urbanization, other changing land use practices, disease, and chemical pollution continue to pose a threat to geese; thus, a continuing program is needed to insure long-term habitat protection for a restored population of Aleutian Canada geese.

Present Status of Remnant Populations

By the winter of 1990-91, peak counts of Aleutian geese wintering in California (from segments in the western and central Aleutian Islands) reached 7,000, up from less than 800 geese in spring 1975 (Fig. 3). The population of geese wintering in Oregon (Semidi breeders) numbered 126 individuals in spring 1991, up from less than 70 birds in the early 1980's (Fig. 3). Lists of the major locations used currently in Oregon and California are

(Spring Counts in Oregon)



Spring counts represent winter survivors

(Peak counts in California)

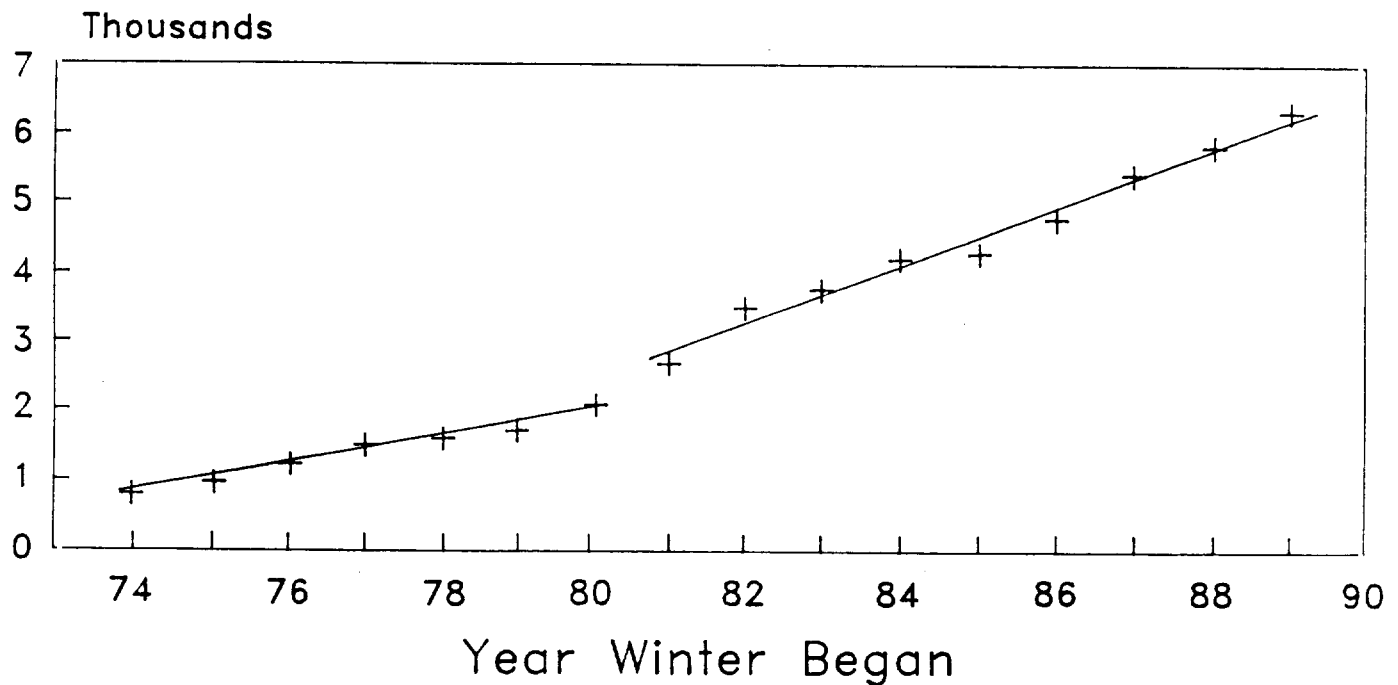


Figure 3. Trends in winter population counts of Aleutian Canada Geese.

provided in Appendix B.

In summer 1990, both the Semidi (Kiliktagik) and central Aleutian (Chagulak and Amukta) segments of the population contained approximately 20-25 breeding pairs of Aleutian Canada geese (Table 2). In contrast, the western Aleutian segment is much larger, with greater than 90 percent of the total population occurring on Buldir Island, and geese nesting on three other islands (although the process of reestablishment is well underway only on Agattu Island)(Byrd in press).

Present Limiting Factors

Aleutian Canada geese are again breeding on two areas in the Near Islands group (Agattu and Nizki-Alaid) where historical records suggest they were abundant in the early 1900's (Fig. 4). There should be ample habitat for significant expansion of breeding geese, particularly on 55,000-acre Agattu. The Near Island group is the only group in the Aleutians where bald eagles do not nest, and this area provides the best opportunity for growth of reestablished populations. The other two islands in the Near Islands, Attu and Shemya, still have introduced fox populations. Unfortunately, the potential for reestablishment of geese on islands to the east of Buldir Island may be lower due to predation by bald eagles. Past releases of geese on Amchitka Island, where eagles are dense, have been characterized by low resighting rates and failure of geese to return in subsequent years. Better results have been obtained through an improved

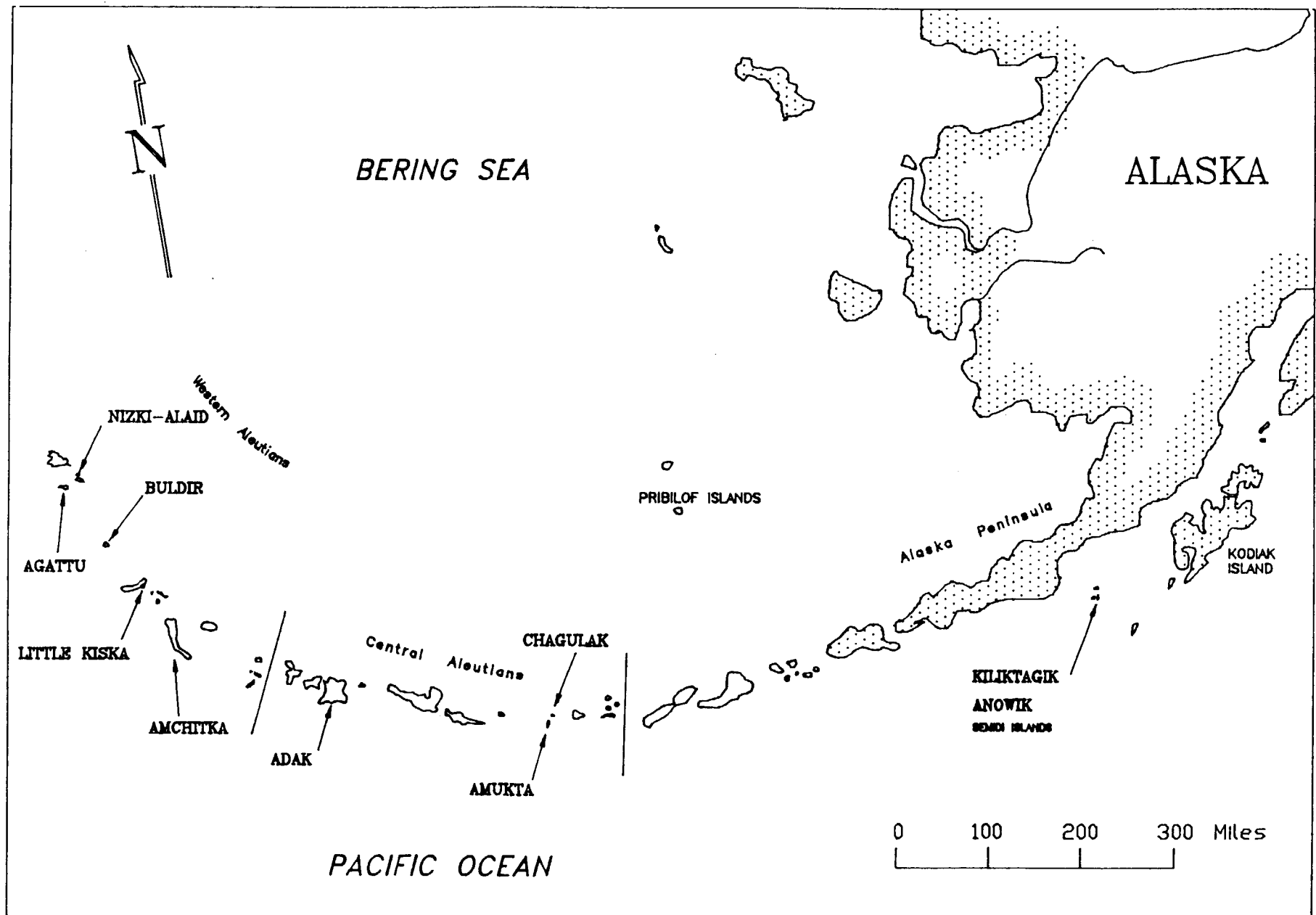


Figure 4. Map of the North American portion of the historical breeding range of Aleutian Canada geese showing location of all remnant populations, release sites, and arbitrary boundaries of breeding segments.

approach during recent translocations to Little Kiska Island, and that study may provide additional suggestions for reducing eagle predation. Nevertheless, eagle predation is still a problem. Obviously, geese coexisted with eagles historically, as they do now on Buldir, Chagulak, and Kiliktagik. Formerly, goose populations must have been large enough to withstand eagle predation without decline. Also, it is likely that seabirds and other large ground nesting birds were much more abundant prior to fox and rat introductions, thus providing a buffer for geese against eagle predation. Although the native fauna begins to recover soon after foxes are removed, it may be decades before former population levels are attained. Reestablishing geese in areas with high eagle populations and where native faunas are still reduced from fox predation may be difficult.

The future lack of adequate migration and winter habitat for Aleutian Canada geese is the greatest potential threat remaining to full recovery. Variable market conditions could cause changes in agricultural practices unfavorable to geese in California and Oregon. Continuing urbanization poses a threat to areas currently used by Aleutian Canada geese, particularly in California's central San Joaquin Valley (Springer and Gregg in press) and East San Francisco Bay. Adverse climatic conditions, such as the drought recently experienced in California, may adversely affect habitat quality and induce undesirable changes in land use practices. Water management at inland roost sites to reduce the potential for disease, particularly in the Central Valley of

California, and implementation of the disease and contaminant contingency plans are essential to neutralize these threats. Furthermore, there is a need to manage refuges and easements to provide optimum feeding conditions for geese (e.g., tender pasture grass about 1-4" high, flooded rice or bean fields, or corn).

PART II
RECOVERY

Objectives

The Aleutian Canada goose will be considered for delisting when the following criteria are met:

1. The overall population of Aleutian Canada geese includes at least 7,500 geese, and long-term trend appears upward.
2. At least 50 pairs of geese are nesting in each of three geographic parts of the historic range: western Aleutians (other than Buldir), central Aleutians, and Semidi Islands, for three or more consecutive years.
3. A total of 25,000-35,000 acres* of feeding and roosting habitat needed for migration and wintering have been secured and are being managed for Aleutian geese.

* A specific acreage target will be set following analyses of past use patterns and habitat relationships (tasks V.B.1 and V.F.4). Failure to achieve the specific acreage target will not necessarily preclude delisting the species if such action otherwise appears warranted.

Narrative

I. Manage breeding habitat on three islands occupied by remnant breeders

Three islands where foxes were never introduced, or did not survive, are known to support remnant segments of Aleutian Canada geese: Buldir, Chagulak, and Kiliktagik. All islands with remnant breeding geese targeted for recovery are within the Alaska Maritime National Wildlife Refuge.

A. Buldir Island

Buldir Island (5,000 acres) in the western Aleutians provides nesting habitat for greater than 90 percent of the current total population of Aleutian Canada geese. Although the island is small, it provides a large amount of nesting (approximately 3,500 acres) and foraging habitat. The robust vegetation on Buldir is due in large part to fertilization by the more than one million seabirds that nest there.

1. Map breeding habitat

This task has been completed, 1980.

2. Develop management plan

Because these islands are part of the Alaska Maritime National Wildlife Refuge, management strategies are contained in the Refuge's Comprehensive Conservation Plan. Completed, 1988.

3. Implement management plan

Specific management strategies ongoing include regulation of public use, protection from introduction of exotic predators, and designation as a Wilderness and Research Natural Area.

4. Monitor breeding population

This island should be surveyed every three years, or more frequently if peak winter population counts indicate a declining trend.

B. Chagulak Island

Chagulak Island is a small (2,000 acres), extremely rugged island located near the Islands-of-Four-Mountains group of

the central Aleutian Islands. The island is also home to nearly one million nesting seabirds, but goose nesting habitat is limited to approximately 500 acres due to the precipitous terrain.

1. Map breeding habitat

This task was initiated in 1990.

2. Develop management plan

See I.A.2 above.

3. Implement management plan

See I.A.3 above

4. Monitor breeding population

See I.A.4 above

C. Kiliktagik Island

A very small island (300 acres) located in the Semidi Islands group off the south coast of the Alaska Peninsula, Kiliktagik Island has a small but dense remnant colony on approximately 150 acres of habitat. Further expansion of this colony may be inhibited by the lack of nesting habitat.

1. Map breeding habitat

Delineate areas of suitable nesting and foraging habitat.

2. Develop management plan

See I.A.2 above.

3. Implement management plan

See I.A.3 above

4. Monitor breeding population

See I.A.4 above

II. Reintroduce geese to unoccupied historic breeding habitat

Reintroductions are necessary to achieve the recovery objective of 50 nesting pairs per breeding area because: 1) population growth of the remnant segments at Chagulak and Kiliktagik islands may be limited by availability of suitable nesting habitat; and 2)

natural pioneering of Aleutian geese appears to be slow. Also, it is desirable to disperse nesting Aleutian geese throughout their historic range to reduce the potential for a stochastic event to cause extinction. Reestablished populations should be managed as in item I above.

A. Identify criteria for selecting reintroduction islands

The criteria selected include absence of foxes, low densities of bald eagles, suitable nesting, molting, and brood rearing habitat, and a suitable release site. Reintroduction sites must also be within appropriate logistics range of the source island.

B. Select islands for reintroduction and reintroduce geese

Based on the criteria identified in A above, islands should be selected in different portions of the historic range (i.e., western Aleutians, central Aleutians, Semidi Islands; Fig. 4). Islands so far selected, some preliminarily, in each area are listed below. Other islands (Appendix A) may be added or substituted as necessary.

1. Western Aleutians

An active reintroduction program is underway in this area, which includes the Near, Rat, and Delarof island groups.

a. Select islands for reintroduction

To date, islands selected for reintroduction are Agattu, Nizki-Alaid, Little Kiska, Kiska, and Amchitka.

b. Develop reintroduction plan

Specific annual plans should be developed for each reintroduction site. The plan should include a prioritized list of release sites, along with details about the numbers of birds, timing, frequency, and duration of releases, and a protocol for banding and monitoring.

c. Remove introduced foxes

This task has been completed (Appendix A). Foxes were removed from Amchitka (1961), Nizki-Alaid (1977), Agattu (1978), and Kiska (1988). Foxes apparently died out naturally on Little Kiska and on some of the Delarof Islands.

d. Reintroduce geese

Geese were released at Agattu periodically from 1974 to 1984, and by 1990, this population contained over 50 nesting pairs (i.e., was determined to be self-sustaining). Therefore, unless there is a reversal in population trends at Agattu, no further translocations are planned for that island. Translocations were initiated at Nizki-Alaid in 1981 and by 1987 geese were nesting there. Translocations need to be continued here for at least several more years to help secure this population. Expanded populations at Agattu and Nizki-Alaid are likely to provide the best opportunity to exceed the recovery objective of 7,500 geese. Periodic releases of geese occurred at Amchitka between 1971 and 1988, but geese have not become reestablished there. Predation by bald eagles is suspected of precluding success, and releases at Amchitka have been curtailed at least temporarily. Translocation and subsequent monitoring at Little Kiska is beginning to suggest ways to reduce eagle predation (e.g., release small numbers of relatively old goslings directly onto lakes near tall cover).

e. Monitor populations at release sites

Nesting surveys are ongoing in the western Aleutians, being conducted on Agattu, and Nizki-Alaid at least once every three years. Little Kiska has been surveyed yearly since 1988 to assess the success of translocations there.

2. Central Aleutians

This area includes the Andreanof Islands and the Islands-of-Four-Mountains groups (Fig. 4). The remnant populations on Chagulak and Buldir island are currently the main potential sources of geese for translocations. However, the population on Chagulak may be too small to allow removal of geese for translocations.

a. Select islands for reintroduction

Potential sites which appear to meet the criteria identified in A above include Amukta, Carlisle, and Uliaga islands (Appendix A).

b. Develop a reintroduction plan

This plan should include a determination of the minimum size that source populations should attain prior to removing geese for translocations. It should also include a prioritized list of release sites, along with details about the numbers of birds, timing, frequency, and duration of releases, and a protocol for banding and monitoring.

c. Remove introduced foxes

Foxes removal was completed on Amukta in 1984, Carlisle in 1990, and is now underway on Uliaga (Appendix A).

d. Reintroduce geese

After the source population has been determined to be of adequate size, geese should be translocated to selected release sites.

e. Monitor populations at release sites

Beginning the year following the first translocation, release sites should be surveyed for returning geese. Nesting would not be expected for two or three years following the first release, but once nesting is established, nesting surveys should be conducted every three years.

3. Semidi Islands

No fox removal is necessary in the Semidi Islands group because the introduced predators died out naturally. The remnant breeding population of geese in the Semidis is on Kiliktagik Island, and recently geese were found on nearby Anowik Island (Fig. 4). These islands, and Buldir Island, are the potential sources for translocations in the Semidi Islands group.

a. Select islands for reintroduction

Potential release sites include Aghiyuk, Chowiet, and possibly the smaller islands in the group (Appendix A). Habitat surveys should be conducted to assess the relative potential of various islands for goose nesting.

- b. Develop a reintroduction plan

See II.B.2.b above.

- c. Reintroduce geese

After the source population has been determined to be of adequate size, geese should be translocated to selected release sites.

- d. Monitor populations at release sites

See II.B.2.e above.

III. Secure and manage 25,000-35,000 acres of feeding and roosting habitat needed for migration and wintering

Lack of protection of migration and wintering habitats is one of the greater threats facing the recovery of the Aleutian Canada goose. Variable climate and unstable markets could result in changing agricultural practices, leaving the Aleutian goose population with insufficient migration/wintering habitat. In certain areas, urbanization is a major threat. A few habitat areas have been protected, including the Lake Earl State Wildlife Area and Project, Butte Sink National Wildlife Refuge near Colusa, East Bay Municipal Utility District lands near El Sobrante, part of the new San Joaquin River National Wildlife Refuge, and islands along the coast of California and Oregon. Because of its uncertain future, securing suitable migration/wintering habitat is a high recovery priority. Methods of securing habitat include fee acquisition, wildlife easements, cooperative agreements, habitat conservation plans, and habitat donations.

Research on habitat requirements is underway to refine the habitat protection goal (see task V.B.1 and V.F.4). Failure to achieve the specific acreage target will not necessarily preclude delisting the species if such action otherwise appears warranted.

A. Identify, survey, and map migration/wintering habitat

Because the historical winter range of the Aleutian Canada goose is not fully known, surveys were conducted in areas where sightings had been reported. It was learned that pasture, harvested grain and bean fields, and sprouting winter wheat fields are used for feeding. Large ponds or lakes, and off-shore islands are used for roosting. Use areas (Appendix B) have been surveyed over a 15-year period and new areas continue to be identified. All currently occupied migration/winter habitat has been mapped and the ownership of the mapped units has been determined.
Completed, 1990

B. Select migration/winter habitat for protection

Traditional use areas as of 1990 should be selected for protection (Appendix B). Certain traditional roosting areas (e.g., Modesto oxidation ponds) have a high incidence of disease outbreaks, and objectives are to provide alternative sites. Because some landowners may be unwilling to participate in a program to secure habitat for geese, suitable areas other than those identified may be added or substituted to meet the recovery objective.

C. Secure and manage migration/winter habitat

Initiate a program to secure key Aleutian goose habitat (by fee title, easement, trades, etc.) in the following major use areas. Secured habitat should be managed for optimum quality.

1. Coastal Oregon

This area includes pasture feeding habitat in the Pacific City and Woods area for the Semidi Islands segment of Aleutian geese (Appendix B). Other feeding habitat (for Aleutian breeders) occurs on pastures in the Langlois area of southern Oregon. Roosting occurs on several coastal islands.

a. Secure selected habitat

In 1990 the Service took steps toward protecting key habitat by proposing to establish the Nestucca Bay National Wildlife Refuge. The Bureau of Land Management manages 537 acres of goose feeding habitat near Langlois. Off-shore islands used for roosting are part of the Oregon Islands National Wildlife Refuge.

b. Develop a management plan

Include specifications for grazing and crop maintenance, water levels, etc. Attach the Disease and Contamination Hazard Contingency Plan for this area. This task has been completed for the Oregon Islands National Wildlife Refuge.

c. Implement management plan

Management should be directed toward optimizing feeding and roosting conditions for geese, in accordance with guidelines in the manual produced from task V.B.3.

2. Crescent City area, California

Located in northern coastal California, this area is used primarily during fall and spring staging. Both private and state-owned pastures are used for feeding (Appendix B). Geese roost on Castle Rock, Prince Island, and Lake Earl.

a. Secure selected habitat

Approximately half of the habitat used by geese has been secured, including Castle Rock National Wildlife Refuge (13 acres) and Lake Earl State Wildlife Area and Project (800 acres).

b. Develop a management plan

This task has been initiated for Lake Earl Wildlife Area. The management plan should also consider the habitat requirements of the Oregon silverspot butterfly, a listed endangered species which inhabits the area.

c. Implement management plan

Research now underway at Lake Earl to determine response of geese to various habitat treatments (e.g., fertilization, grazing, burning) will provide a basis for management actions. Management actions should be in accordance with guidelines in the manual produced in task V.B.3.

3. Colusa area, California

This area in the Sacramento Valley serves as a fall staging area for large numbers of Aleutian geese. Some geese stop first in the Crescent City area, but most migrate directly to Colusa in the fall and stay about 1.5 months before heading south in December. On harvested fields located along the Sacramento River, geese feed on waste beans, rice, and corn, and sprouting winter wheat (Appendix B). Roosting occurs in flooded fields, ponds, and berms in rice fields in the Butte Sink.

a. Secure selected habitat

Approximately 733 acres of the Butte Sink, an area used for roosting, have been secured as the Butte Sink National Wildlife Refuge.

b. Develop a management plan

To date a plan has been developed for the Butte Sink National Wildlife Refuge.

c. Implement management plan

The Butte Sink National Wildlife Refuge is managed as a seasonally flooded marsh providing roosting habitat for Aleutian geese. Management actions should be in accordance with guidelines in the manual produced in task V.B.3.

4. East San Francisco Bay, California

Use of this area is generally for one to three months during the early winter. Ponds, reservoirs, and pastures are used, especially San Pablo Reservoir and the Nunes Ranch near El Sobrante. More banding research is needed to determine the breeding sites of geese using this area.

a. Secure selected habitat

The current goose use area is owned by the East Bay Municipal Utility District (50 acres), which manages the area for watershed purposes. The El Sobrante property is also leased for cattle grazing.

b. Develop a management plan

The managers have attempted to protect geese from undue disturbance and are interested in preparing a formal habitat management plan. Management should include maintenance of grazing, restrictions on public access, and protection of geese on the reservoir and at El Sobrante from disturbance.

c. Implement management plan

Management actions should be in accordance with guidelines in the manual produced in task V.B.3.

5. Northern San Joaquin Valley, California

This area is the primary wintering location for geese from the Aleutian Islands breeding segments. Geese have traditionally fed on pastures of the Mapes and Faith Ranches near Modesto, although geese have been observed using areas as far south as Los Banos.

(Appendix B). Roost sites include ranch ponds and the oxidation ponds at the Modesto waste water treatment facility.

a. Secure selected habitat

The Service initiated (1987) an active program to acquire goose habitat as part of the new San Joaquin River National Wildlife Refuge. The goal of the program is to acquire approximately 10,000 acres of goose habitat in the area.

b. Develop a management plan

In addition to management of feeding areas, strategies developed in task IV.B.1 should be included due to the high potential for disease outbreak in this area.

c. Implement management plan

Management actions should be in accordance with the guidelines in the manual produced in task V.B.3.

IV. Protect geese from losses due to hunting, disease, and contamination

Protection of Aleutian geese from hunting has contributed greatly to their upward population trend. As needed for recovery purposes, hunting may remain closed within the Aleutian geese range, and certain traditional winter use areas may be closed to the take of all subspecies of Canada geese to prevent shooting losses to Aleutian geese due to mistaken identification.

The potential for significant losses of Aleutian geese due to disease becomes greater as the population increases and large numbers of geese concentrate along with other waterfowl. In 1991, 58 Aleutian geese were known to have died during an outbreak of avian cholera in the San Joaquin Valley. Although this is a small proportion of the total population, it is significant if the involved birds were from one of the small remnant or newly reestablished breeding populations.

A. Maintain appropriate Canada goose hunting closure zones

Hunting closure zones should continue to be based on traditional goose use and adjusted according to behavioral changes. Traditional high use areas should initially remain closed to the hunting of all Canada geese due to the

difficulty of distinguishing different subspecies in the field.

1. Alaska

Canada goose hunting closures include the Aleutian Islands and Semidi Islands.

2. Oregon

Hunting closures currently occur in Klamath, Tillamook, Lane, Douglas, Coos, and Curry counties.

3. California

Hunting closures currently occur in Del Norte, Humboldt, Glenn, Butte, Colusa, Yuba, Stanislaus, San Joaquin, and Merced counties.

- B. Enforce hunting regulations

Maintain an active hunter education and law enforcement program for the purposes of reducing the loss of Aleutian geese due to illegal hunting.

- C. Protect geese from losses due to disease and contamination

1. Develop strategies to reduce the impact of diseases and contamination through preventative measures

Secure and manage roost sites to encourage dispersment of geese, preventing concentrations at areas where disease outbreaks or contamination commonly occur (see task III.F). Test management practices that will reduce disease outbreaks, and deter geese from using disease outbreak areas.

2. Develop protocols to be invoked during disease outbreaks or contamination incidents

Update the Aleutian Canada Goose Disease and Contamination Hazard Contingency Plan on a yearly basis to reflect new information and agency or personnel changes. The plan should be customized for each particular management area and attached to the area management plan (see task III.G).

V. Conduct biological research and monitoring on Aleutian geese

In order to meet the recovery objectives, additional biological research and continued monitoring of Aleutian geese is necessary.

A. Determine management needs for breeding habitat

1. Determine habitat characteristics for breeding use areas

Habitat characteristics at breeding sites in the western Aleutians have been documented, but this remains to be accomplished for the central Aleutians and the Semidi Islands.

2. Evaluate treatments to enhance nesting, brood-rearing, and foraging habitat

Evaluate the effects of recovering nesting avifauna, following fox removal, on breeding habitat. Determine if fertilization at selected islands is desirable and feasible to enhance cover.

B. Determine management needs for optimal use of habitat for use by migrating and wintering geese

1. Determine habitat characteristics for migration and wintering use areas

Evaluate forage types and nutrient content of plants preferred by Aleutian geese. Determine physical attributes and juxtaposition of feeding and roosting sites. Investigate the effect of competition with other species.

2. Evaluate treatments to enhance foraging and roosting areas

Document the effects of various pasture and grazing management techniques. Determine the appropriate crop rotation and amount of waste grain needed for optimal goose use. Determine optimal roost site characteristics.

3. Produce a manual for managing habitat for geese

The manual should be suitable for use by both agency managers and private landowners. It should include recommendations for enhancing foraging and roosting areas, methods to alleviate depredations to crops, and contacts for reporting disease outbreaks.

- C. Evaluate the impacts of exotic and indigenous predators on remnant and reintroduced goose populations

1. Evaluate impacts of eagles

Monitor releases of geese into eagle-inhabited areas (e.g., Little Kiska Island) and investigate ways to reduce eagle predation (see tasks V.A.2 and II.B.1.d). Specifically, evaluate the translocation of eagles from selected goose release sites.

2. Evaluate impacts of exotic rodents

The impact of introduced rats and ground squirrels on nesting success is not known. Rat-geese interaction should be investigated on Little Kiska Island. The potential impacts of ground squirrels on geese should be investigated in the Semidi Islands.

- D. Determine migration routes and wintering areas among the Aleutian Canada goose breeding segments

It appears that the Semidi Islands breeders are at least geographically distinct from the central and western Aleutian segments, but the relationship between the central (Chagulak) and western Aleutian (Buldir) breeders is less clear.

1. Band geese to determine movements

Geese should be marked with colored and numbered leg bands unique to each breeding segment. Resighting information should be recorded at breeding, migration, and wintering areas (see task V.F.1).

- E. Evaluate the use of captive-raised geese

1. Develop techniques for the captive propagation of Aleutian geese.

Completed, 1983

2. Determine the effectiveness of using captive-raised geese for restoring wild breeding populations.

Completed, 1983

3. Publish results obtained during the captive propagation program on growth and development of geese and captive-rearing and release techniques.

Although the portion of the Aleutian goose recovery program dealing with captive-raised geese is mostly completed, the knowledge gained from this work is widely applicable and should be made available to other conservation biologists. Furthermore, analysis of data on releases may aid in developing a technique for reestablishing geese in areas with eagle populations (see V.C.1)

F. Evaluate recovery objectives

It is important to evaluate the results of recovery efforts to determine their effectiveness and to provide information necessary to revise recovery goals and objectives.

1. Monitor goose migration/wintering population and habitat

Census seasonal and peak winter population; record sightings of banded birds; determine age ratios; survey for and map new use areas; record seasonal timing and type of use; report type and incidence of mortality, disturbance, and depredation; and monitor quality of habitat.

2. Develop a demographic database and retrieval system for breeding and wintering populations of Aleutian geese

An automated system is being developed for storing and retrieving past and future wintering ecology data. Elements of the system include sightings and recoveries of all banded birds for the purpose of archiving records and analyzing survival rates, habitat use, and social relationships.

3. Develop a population model incorporating productivity and survival data

Using information contained in the above database, analyze the survival of banded birds and together with productivity data develop a model that may be used to evaluate progress of the population toward recovery goals. The model should also be used to project the likelihood of Aleutian goose survival into the future.

4. Summarize research findings

Document the results in a publication on population trends, distribution, habitat and social relationships, and other aspects of the migration and winter ecology of Aleutian Canada geese.

5. Revise the recovery plan

Update or revise the Aleutian Canada Goose Recovery Plan every five years or sooner as new information is received. Revise the recovery objectives based on the results of biological research.

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PART III

IMPLEMENTATION SCHEDULE

The table that follows is a summary of scheduled actions and costs for this recovery program. It is a guide to meet the objectives of the Aleutian Canada Goose Recovery Plan, as elaborated upon in Part II, Narrative Section. This table indicates the priority in scheduling tasks to meet the objectives, which agencies are responsible to perform these tasks, a time-table for accomplishing these tasks, and the estimated cost to perform them. Implementing Part III is the action of the recovery plan, that when accomplished, will satisfy the prime objective. Initiation of these actions is subject to the availability of funds.

Priorities in Column 1 of the following implementation schedule are assigned as follows:

- Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly.
- Priority 2 - An action that must be taken to prevent a significant decline in the species population/habitat quality, or some other significant negative impact short of extinction.
- Priority 3 - All other actions necessary to provide for full recovery of the species.

Because the Aleutian Canada goose has been reclassified to threatened status (i.e., determined to no longer be in imminent danger of extinction) there are no Priority 1 tasks.

Recovery Plan Implementation Schedule for the Aleutian Canada Goose

PRIOR- ITY #	TASK #	TASK DESCRIPTION	TASK DURA- TION (YRS)	RESPONSIBLE PARTY	TOTAL COST	FY 1992	COST ESTIMATES (\$1,000)				Comments
						FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	
Cost Need 1: Protect Population and Secure Winter Habitat											
2	IVA1	Maintain Canada Goose Hunting Closures Alaska	cont.	ADFG	5	1	1	1	1	1	
2	IVA2	Oregon	cont.	ODFW	5	1	1	1	1	1	
2	IVA3	California	cont.	CDFG	5	1	1	1	1	1	
2	IVB	Enforce hunting regulations	cont.	FWS1-LE	125	25	25	25	25	25	
[2]	IIIA	Identify, survey, and map migration/ wintering habitat		FWS7-SE*	0						Completed, 1989
				FWS1-SE	0						
				FWS1-ARW	0						
				ODFW	0						
				CDFG	0						
[2]	IIIB	Select migration/ wintering habitat for protection		FWS7-SE*	0						Completed, 1990
				FWS1-SE	0						
				FWS1-ARW	0						
				ODFW	0						
				CDFG	0						
2	IIIC1a	Secure Migration/Wintering Habitat Coastal Oregon	5	FWS1-ARW*	0	?	?	?	?	?	
				FWS1-SE	0	?	?	?	?	?	
				ODFW	0	?	?	?	?	?	
				BLM	0	?	?	?	?	?	
2	IIIC2a	Crescent City	5	FWS1-ARW*	0	?	?	?	?	?	
				FWS1-SE	0	?	?	?	?	?	
				CDFG	0	?	?	?	?	?	
2	IIIC3a	Colusa	5	FWS1-ARW*	0	?	?	?	?	?	
				FWS1-SE	0	?	?	?	?	?	
				CDFG	0	?	?	?	?	?	
2	IIIC4a	East San Fran Bay	5	FWS1-ARW*	0	?	?	?	?	?	
				FWS1-SE	0	?	?	?	?	?	
				CDFG	0	?	?	?	?	?	
2	IIIC5a	San Joaquin Valley	5	FWS1-ARW*	0	?	?	?	?	?	
				FWS1-SE	0	?	?	?	?	?	
				CDFG	0	?	?	?	?	?	
Subtotal cost need 1					140	28	28	28	28	28	

Recovery Plan Implementation Schedule for the Aleutian Canada Goose

PRIOR- ITY #	TASK #	TASK DESCRIPTION	TASK DURA- TION (YRS)	RESPONSIBLE PARTY	TOTAL COST	COST ESTIMATES (\$1,000)					Comments
						FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	
Cost Need 5: Verify/Determine Recovery Objectives											
3	VF1	Monitor migration/ winter population and habitat	cont.	FWS7-SE*	81	20	20	20	20	1	
				FWS1-SE	14	1	1	1	1	10	
				FWS1-ARW	22	3	3	3	3	10	
				ODFW	2.5	0.5	0.5	0.5	0.5	0.5	
				CDFG	2.5	0.5	0.5	0.5	0.5	0.5	
3	VF2	Develop demographic database and retrieval system	1	FWS7-SE	5	5					Initiated, 1988
3	VF3	Develop population model	1	FWS7-SE	10	10					Initiated, 1988
3	VF4	Evaluate the outputs of the population model	1	FWS7-SE	10	10					Initiated, 1988
3	VF5	Revise the recovery plan	1	FWS7-SE*	10					10	
				FWS1-SE	5					5	
		Subtotal cost need 5			162	50	25	25	25	37	
Total Yearly Cost					2046	420	376	427	393	430	

Cont. = The action will be implemented on an annual basis once the action is begun.

* = Lead Agency

? = Value undetermined

[] = Completed task

FWS1-ARW = U.S. Fish and Wildlife Service, Region 1 Refuges and Wildlife

FWS1-SE = U.S. Fish and Wildlife Service, Region 1 Fish and Wildlife Enhancement

FWS1-LE = U.S. Fish and Wildlife Service, Region 1 Law Enforcement

FWS7-ARW = U.S. Fish and Wildlife Service, Region 7 Refuges and Wildlife

FWS7-SE = U.S. Fish and Wildlife Service, Region 7 Fish and Wildlife Enhancement

BLM = Bureau of Land Management

ODFW = California Department of Fish and Game

ODFW = Oregon Department of Fish and Wildlife

EBMUD = East Bay Municipal Utility District

Recovery Plan Implementation Schedule for the Aleutian Canada Goose

PRIOR- ITY #	TASK #	TASK DESCRIPTION	TASK DURA- TION (YRS)	RESPONSIBLE PARTY	TOTAL COST	COST ESTIMATES (\$1,000)					Comments
						FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	
Cost Need 2: Conduct Needed Biological Research											
2	VB1	Determine habitat requirements for migration/wintering	3	FWS7-SE*	90	30	30	30			
				FWS1-SE	3	1	1	1			
				FWS1-ARW	3	1	1	1			
				ODFW	3	1	1	1			
				CDFG	3	1	1	1			
2	VD1	Band geese to determine movements	5	FWS7-ARW*	60	12	12	12	12	12	
				FWS7-SE	15	3	3	3	3	3	
2	VA1	Determine habitat requirments for breeding use areas	2	FWS7-ARW	10	5	5				
2	VA2	Evaluate treatments to enhance breeding habitat	3	FWS7-ARW	21	7	7	7			
2	VB2	Evaluate treatments to enhance mig/wint. habitat	5	FWS1-ARW	25	5	5	5	5	5	
			2	CDFG	10	5	5				
2	VB3	Produce a manual for managing mig/wint habitat for geese	1	FWS7-SE	5			5			
2	VC1	Evaluate impacts of eagles	3	FWS7-ARW*	90	30	30	30			
				FWS7-SE	30	10	10	10			
2	VC2	Evaluate impacts of exotic rodents	2	FWS7-SE*	2			1	1		
				FWS7-ARW	60			50	10		
[2]	VE1	Develop techniques for propagating geese		FWS7-SE	0						Completed, 1983
2	VE3	Produce on manual on goose propagation	2	FWS7-SE	20	10	10				
		Subtotal cost need 2			450	121	121	157	31	20	

Recovery Plan Implementation Schedule for the Aleutian Canada Goose

PRIOR- ITY #	TASK #	TASK DESCRIPTION	TASK DURA- TION (YRS)	RESPONSIBLE PARTY	TOTAL COST	FY 1992	COST ESTIMATES (\$1,000)				Comments
						FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	
Cost Need 3: Reintroduce Geese and Manage Breeding Habitat											
Map Remnant Breeding Habitat											
(2)	IA1	Buldir Island		FWS7-ARW	0						Completed, 1980
2	IB1	Chagulak Island	1	FWS7-ARW	3	3					Initiated, 1990
2	IC1	Kiliktagik Island	2	FWS7-ARW	4		2	2			
Develop Management Plan for Remnant Breeding Habitat											
(2)	IA2	Buldir Island		FWS7-ARW	0						Completed, 1988
(2)	IB2	Chagulak Island		FWS7-ARW	0						Completed, 1988
(2)	IC2	Kiliktagik Island		FWS7-ARW	0						Completed, 1988
Implement Management Plan for Remnant Breeding Habitat											
2	IA3	Buldir Island	cont.	FWS7-ARW	5	1	1	1	1	1	
2	IB3	Chagulak Island	cont.	FWS7-ARW	5	1	1	1	1	1	
2	IC3	Kiliktagik Island	cont.	FWS7-ARW	5	1	1	1	1	1	
Census Remnant Nesting Population											
2	IC4	Kiliktagik Island	cont.	FWS7-ARW	20	10			10		
2	IB4	Chagulak Island	cont.	FWS7-ARW	20		10			10	
2	IA4	Buldir Island	cont.	FWS7-ARW	20			20			
(2)	IIA	Identify criteria for selecting re- introduction islands		FWS7-ARW	0						Completed, 1980
Select Islands for Reintroduction											
(2)	IIB1a	Western Aleutians		FWS7-ARW*	0						Completed, 1979
				FWS7-SE	0						
2	IIB2a	Central Aleutians	1	FWS7-ARW*	1	1					
				FWS7-SE	1	1					
2	IIB3a	Semidi Islands	1	FWS7-ARW*	1		1				
				FWS7-SE	1		1				
Develop a Reintroduction Plan											
2	IIB1b	Western Aleutians	3	FWS7-ARW*	3	1	1	1			
				FWS7-SE	3	1	1	1			
2	IIB2b	Central Aleutians	2	FWS7-ARW*	2				1	1	
				FWS7-SE	2				1	1	
2	IIB3b	Semidi Islands	2	FWS7-ARW*	2				1	1	
				FWS7-SE	2				1	1	

Recovery Plan Implementation Schedule for the Aleutian Canada Goose

PRIOR- ITY #	TASK #	TASK DESCRIPTION	TASK DURA- TION (YRS)	RESPONSIBLE PARTY	TOTAL COST	COST ESTIMATES (\$1,000)					Comments
						FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	
45	[2]	IIB1c	Remove Introduced Fox Western Aleutians		FWS7-ARW* FWS7-SE	0 0					Completed, 1988
	2	IIB2c	Central Aleutians	1	FWS7-ARW* FWS7-SE	5 1	5 1				
	2	IIB1d	Reintroduce Geese Western Aleutians	3	FWS7-ARW* FWS7-SE	315 6	105 2	105 2	105 2		
	2	IIB2d	Central Aleutians	2	FWS7-ARW* FWS7-SE	210 4			105 2	105 2	
	2	IIB3c	Semidi Islands	2	FWS7-ARW* FWS7-SE	210 4			105 2	105 2	
	2	IIB1e	Monitor Reintroduced Populations Western Aleutians	ongoing	FWS7-ARW* FWS7-SE	117 5	29 1	29 1	29 1	20 1	10 1
	2	IIB2e	Central Aleutians	ongoing	FWS7-ARW* FWS7-SE	20 2			10 1	10 1	
	2	IIB3d	Semidi Islands	ongoing	FWS7-ARW* FWS7-SE	10 1				10 1	
		Subtotal cost need 3			1010	163	156	164	263	264	
		Cost Need 4: Manage Migration and Wintering Habitat									
	2	IIIC1b	Develop a Management Plan for Migration/Wintering Habitat Coastal Oregon	1	FWS1-ARW* FWS1-SE ODFW	5 1 1				5 1 1	
	2	IIIC2b	Crescent City	1	FWS1-ARW* FWS1-SE CDFG	5 1 5	5			5 1	
	2	IIIC3b	Colusa	1	FWS1-ARW* FWS1-SE CDFG	5 1 1				5 1 1	
	2	IIIC4b	East San Fran Bay	1	EBMUD* FWS1-SE CDFG	5 1 1	5 1 1				

Recovery Plan Implementation Schedule for the Aleutian Canada Goose

PRIOR- ITY #	TASK #	TASK DESCRIPTION	TASK DURA- TION (YRS)	RESPONSIBLE PARTY	TOTAL COST	COST ESTIMATES (\$1,000)					Comments
						FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	
2	IIIC5b	San Joaquin Valley	1	FWS1-ARW* FWS1-SE CDFG	5 1 1			5 1 1			
2	IIIC1c	Implement Management Plan for Migration/Wintering Habitat Coastal Oregon	cont.	FWS1-ARW* FWS1-SE ODFW	10 2.5 2.5	2 0.5 0.5	2 0.5 0.5	2 0.5 0.5	2 0.5 0.5	2 0.5 0.5	
2	IIIC2c	Crescent City	cont.	FWS1-ARW* FWS1-SE CDFG	10 2.5 75	2 0.5 15	2 0.5 15	2 0.5 15	2 0.5 15	2 0.5 15	
2	IIIC3c	Colusa	cont.	FWS1-ARW* FWS1-SE CDFG	25 2.5 2.5	5 0.5 0.5	5 0.5 0.5	5 0.5 0.5	5 0.5 0.5	5 0.5 0.5	
2	IIIC4c	East San Fran Bay	cont.	EBMUD* FWS1-SE	25 2.5	5 0.5	5 0.5	5 0.5	5 0.5	5 0.5	
2	IIIC5c	San Joaquin Valley	cont.	FWS1-ARW* FWS1-SE CDFG	40 2.5 2.5	5 0.5 0.5	5 0.5 0.5	5 0.5 0.5	5 0.5 0.5	20 0.5 0.5	
2	IVB1	Develop strategies to prevent impacts from disease/contam.	cont.	FWS1-ARW* FWS7-SE ODFW CDFG	5 5 5 5	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	
2	IVB2	Develop protocols for disease outbreak or contam. incident	cont.	FWS1-ARW* FWS7-SE ODFW CDFG	5 5 5 5	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	
		Subtotal cost need 4			284	58	46	53	46	81	

Part IV
APPENDICES

Appendix A. Status of North American Island Groups within the
Historic Range of the Aleutian Canada Goose.

Group	Nesting ^a Islands	Current Status
Near ^b	Attu Shemya Nizki/Alaid Agattu	Foxes and rats present Foxes and rats present Foxes removed, Geese becoming re-established Foxes removed, Geese becoming re-established
---- ^c	Buldir	Largest remnant population of geese
Rat	Kiska Little Kiska Segula Davidof/Khvostof Little Sitkin Semisopochnoi Rat Amchitka	Foxes recently removed, rats present Foxes died out, rats present, geese recently released Foxes present Foxes died out Foxes present Foxes present Foxes removed, rats present Foxes removed, rats present, geese released
Delarof	Ogliuga Kavalga Skagul Gareloi Ulak Amatignak	Foxes died out Foxes died out, ground squirrels present Foxes died out Foxes present Foxes present Foxes present
W. Andreanof	Tanaga Kanaga Bobrof Adak Kagalaska Little Tanaga Great Sitkin Umak Chugul Igitkin Tagalak	Foxes present Foxes present Foxes present Foxes present, rats present Foxes present, rats present Fox removal underway Foxes present Fox removal underway Foxes died out Fox removal underway Foxes died out
E. Andreanof	Atka Amlia Sequam Amukta Chagulak Yunaska	Foxes present, rats present Foxes present Foxes present Foxes removed, 1 pair of geese nested recently Small remnant population of geese Foxes present

Group	Nesting ^a Islands	Current Status
Is.-of-4-Mts	Herbert Carlisle Chuginadak Kagamil Uliaga	Foxes present Foxes removed Foxes present Foxes present Fox removal underway
Fox	Umnak Unalaska Akun Akutan Unalga Rootok Avatanak Tigalda Ugamak	Foxes present, rats present Foxes present, rats present Foxes present Foxes present Foxes present Foxes present Foxes present Foxes present Foxes present
Sanak	Caton Sanak	Foxes died out Foxes present
Pavlof	Dolgoi Ukolnoi Wosnesenski Poperechnoi	Foxes present Foxes present Foxes present Foxes removed
Shumigan	Korovin Andronica Bird Churnabura Simeonof Little Koniuji Big Koniuji	Foxes died out Foxes died out Foxes removed Foxes present Foxes present Foxes present Foxes removed
----	Jacob Mitrofania Sutwik	Foxes died out Foxes died out Foxes died out
Semidi	Aghiyuk Chowiet Kiliktagik Anowik	Foxes died out Foxes died out Small remnant population of geese Geese have recently begun nesting

^a
islands greater than 1,500 acres thought to have had nesting geese

^b
only the Near Islands have no bald eagles, all other islands listed have this native goose predator

^c
not considered part of a formally named group

APPENDIX B

PROPERTIES USED BY ALEUTIAN CANADA GEESE DURING MIGRATION AND WINTER.

Location	Owner	Acreage	Current Land Use	Type of Goose Use	Timing of Goose Use	Known Threats
CALIFORNIA						
Del Norte Co. Castle Rock	USFWS	13a	Wildlife refuge	Roosting	Oct-Dec Feb-April	--
Del Norte Co. Lofton tract	CDFG	300b	Wildlife area; Pasture beef	Roosting Feeding	Oct-Dec Feb-April	Illegal hunting flooded by lake
Del Norte Co. McLaughlin tract	CDFG CDPR	500b	Wildlife area; Pasture beef	Feeding	Oct-Dec Feb-April	Illegal hunting Avian cholera flooded by lake
Del Norte Co. Log pond tract	CDFG	80b	Wildlife area	Feeding	Oct-Dec Feb-April	Illegal hunting
Del Norte Co. Lower lake tract	CDFG	80b	Wildlife area; Pasture beef	Feeding	Oct-Dec Feb-April	Illegal hunting flooded by lake
Del Norte Co. Ferguson west	Brian & Helen Ferguson	168a	Dairy pasture	Feeding	Oct-Dec Feb-April	Illegal hunting Geese unwelcome Flooded by lake
Del Norte Co. Ferguson east	Brian & Helen Ferguson	160b	Dairy pasture	Feeding	Oct-Dec Feb-April	Geese unwelcome.
Del Norte Co. Bliss	Mike Bliss	160a	Dairy pasture	Feeding	Oct-Dec Feb-April	Scotch broom encroachment; Disturbance, human
Del Norte Co. Bennett	Mildred Bennett	110a	Horse pasture	Feeding	Oct-Dec Feb-April	--
Del Norte Co. Hollamera	Rufus McNamera	10b	Pasture	Feeding	Oct-Dec Feb-April	--

Location	Owner	Acreage	Current Land Use	Type of Goose Use	Timing of Goose Use	Known Threats
Curry Co. Island Rk	USFWS	<u>±5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human
Curry Co. Hunters Rk	USFWS	<u>±5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human
Curry Co. Goat Island	USFWS	<u>±5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human

a Total tract area; not all area is used by geese.

b Estimated average area used by geese; part of larger property.

Location	Owner	Acreage	Current Land Use	Type of Goose Use	Timing of Goose Use	Known Threats
CALIFORNIA (con't)						
Del Norte Co. Reservation ranch	Westbrook	400b	Dairy pasture	Feeding	Mar-April	Illegal hunting
Del Norte Co. Prince Island	Indian land	15a	None	Roosting	Mar-April	--
Humboldt Co. Russ	Russ	100b	Pasture	Roosting Feeding	Nov-Mar	Illegal hunting Avian cholera
Colusa Co.	Butte Creek Farms, Otterson	2,175	Farming:rice Hunting	Feeding	Oct-Dec	Illegal hunting
Colusa Co.	Wallace Ranch	1,500	Farming:rice Hunting	Roosting	Oct-Dec	Illegal hunting
Colusa Co.	Steidlmayer Ranch Steidlmayer	3,000	Farming:mixed	Feeding	Oct-Dec	--
Colusa Co.	833 Reclam. District	2,000	Farming:beans Hunting	Feeding Roosting: after flood.	Oct-Dec	Avian cholera
Colusa Co.	Ehrke	350	Farming:varied	Feeding	Oct-Dec	Illegal hunting
Colusa Co.	McGowan	150	Farming:varied	Feeding	Oct-Dec	--
Colusa Co.	Colusa Shooting Club refuge	200	Farming:rice	Roosting Feeding	Oct-Dec	--
Colusa Co.	Butte Sink NWR	733	Refuge Farming:rice easement	Roosting Feeding	Oct-Dec	Avian cholera
Stanislaus Co.	Faith Ranch Gallo	2,300	Cattle ranch	Roosting Feeding	Dec-Feb	Avian cholera

Location	Owner	Acreage	Current Land Use	Type of Goose Use	Timing of Goose Use	Known Threats
CALIFORNIA (con't)						
Stanislaus Co.	Mapes Ranch Lyons	10,500	Cattle; Farming	Roosting Feeding	Dec-Feb	Avian cholera Urbanization
Stanislaus Co.	Dos Rios Ranch (Lyons)	1,562	Farming: orchard & row crops varied	Feeding	Dec-Feb	--
Stanislaus Co.	Deniz Dairy Deniz	500	Farming:wheat	Feeding	Dec-Feb	--
Stanislaus Co.	Island Dairy	400	Farming: alfalfa, corn, wheat	Feeding	Dec-Feb	--
Contra Costa Co.	East Bay Municipal Utility District	20b	Pasture, boating	Roosting Feeding	Nov-Feb	Illegal hunting Adjacent housing development
OREGON						
<u>Semidi Breeders</u>						
Tillamook Co.	N. Hurliman	205	Dairy pasture	Feeding	Oct-April	No long-term habitat security.
Tillamook Co.	A. Hurliman	67	Dairy pasture	Feeding	Oct-April	No long-term habitat security
Tillamook Co.	Martella	111	Dairy pasture	Feeding	Oct-April	Geese unwelcome. No long-term habitat security.

Location	Owner	Acreage	Current Land Use	Type of Goose Use	Timing of Goose Use	Known Threats
OREGON (con't)						
Tillamook Co. Chief Kiwanda Rk	USFWS	<u>+5</u>	OINWR	Feeding Roosting	Oct-April	Disturbance: air craft, boats. Comp.: Dusky Canada goose.
<u>Aleutian Breeders</u>						
Coos Co.	BLM	537	ACEC grazing	Feeding Feb-April	Nov-Dec	--
Coos & Curry Co.	Wilson, Kahn McKensie, Kerwin Pallus, Hammond Kamph, Krieger, Knapp Partners Financial	3,677	Permanent pasture/ wetland	Feeding	Nov-Dec Feb-April	Continued habitat alt. No longterm habitat security.
Floras Lake Curry Co.	Curry Co.	300	County park	Roosting	Nov-Dec? Feb-April?	--
Coos Co. Table Rk	USFWS	<u>+5</u>	OINWR	Roosting Feeding	Nov & Feb-April	Disturbance - human
Coos Co. Middle Coquille Pt. Rk	USFWS	<u>+5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human
Coos Co. Elephant Rk	USFWS	<u>+5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human
Coos Co. Haystack Rk	USFWS	<u>+5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human
Coos Co. Monkey Rk	USFWS	<u>+5</u>	OINWR	Roosting Feeding	Feb-April	Disturbance - human